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(54) **COOLING DEVICE AND ACCESS DOOR**

**KÜHLVORRICHTUNG UND ZUGANGSTÜR**

**DISPOSITIF DE REFROIDISSEMENT ET PORTE D'ACCÈS**

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## Description

**[0001]** The present invention relates to a cooling device for keeping products chilled and displaying them, in particular food and/or beverages, comprising a product space conditioned by cooling means bounded on an entry side by an adjustable access door. The invention also relates to an access door of the type as used in a cooling device according to the present invention. A cooling device according to the preamble of claim 1 is disclosed in DE2739871. Cooling devices are mainly used in supermarkets, department stores and other shops such as corner shops, petrol stations, self-service restaurants etc., to keep products inside chilled. For example, in order to keep products with a limited shelf life such as food and beverages fresh for longer, and to be able to offer certain products for immediate consumption chilled. This concerns mostly vertical cooling walls comprising a cupboard within which cooling means are provided in order to chill and keep chilled to a certain temperature a product space surrounded by the cupboard. Within the product space shelves are provided on which the products are exhibited as an offer to the public passing by. In order to offer the public passing by a good view of the exhibited goods, many original cooling devices are created to be open on the visible side. This however allows chilled air from the product space to circulate freely with warmer air from the surroundings, as a result of which effective and adequate cooling with the cooling means requires relatively large amounts of energy. In addition to higher energy costs for the shop concerned, this also forms a substantial burden on the environment.

**[0002]** Consequently, cooling devices have been made according to the type described in the opening paragraph, whereby the product space is bordered by a so-called day cover in the form of an adjustable access door at the entry side. The access door forms a partition which counteracts a free exchange of air between the product space and any surrounding air, and as a result helps to lower the consumption of the cooling device. The access door in known cooling devices is often mostly made of a glass plate. Such a glass plate can be transparent so as to hardly detract from a view of the exhibited goods in the cooling device. However, in view of the usual dimensions of the access door used in a cooling device the glass plate has to be relatively thick for a sufficiently reliable strength, which results in a heavy impractical whole.

**[0003]** A plate of plastic with corresponding dimensions has a significantly lower weight than its glass counterpart. Accordingly, a number of alternative cooling devices are known where the access door is chiefly made of a plastic plate. However, for a sufficiently stiff access door in which unwanted curvatures and other deformations through exposure to fluctuations in temperature and moisture or possibly its weight are prevented, it is apparent that a thickness of the plastic plate used nevertheless leads to a substantial total weight of the whole.

**[0004]** The present invention thus inter alia intends to provide a cooling device with an at least in this regard improved access door without compromising on its optical properties.

**[0005]** In order to achieve the intended goal a cooling device of the type described in the opening paragraph is, in accordance with the invention disclosed in claim 1. The invention is moreover based on the insight that multi-walled constructions consisting of walls attached to each other at the edge parts with an enclosed cavity space, a kind of box structure as it were, not only offers very good stiffness to the access door so no deformation takes place, but due to the presence of the cavity also insulates well and reduces condensation on the transparent access door. Consequently, due to its high stiffness the access door needs less material, so that it can be made with a relatively light weight, whereas good visibility of the goods exhibited in the product space of the cooling device is maintained in almost all cases.

**[0006]** Within the context of the invention the cooling device according to the invention is characterized in that at least one of both walls comprises a central part at the location of the cavity which is offset from the edge part and borders the cavity. Accordingly, the wall concerned can be made of an at least almost completely flat central part, whereby a part of the wall extending from the central part comprises the edge part to be attached to an edge part of the other of the walls while enclosing the cavity. The other of the walls can thus be made completely flat so that production costs can be reduced. Although either one of the walls can be chosen as the completely flat wall, the other wall say comprising the offset central part, the access door is aesthetically at its most attractive with a completely flat wall on the visible side of the access door. Consequently the cooling device according to the present invention in a special embodiment is characterized in that the first wall is at a visible side of the access door and is at least almost completely flat and that the second wall comprises the central part offset from the edge part.

**[0007]** A total thickness of the construction of the access door is preferably adapted to the usual dimensions for use of such doors, so that the access door according to the present invention can be used with already existing or commonly used furniture and locking means. Within this total thickness a thickness of the cavity is preferably a minimum of 8mm for good insulation. A remaining thickness of the door can be variably attributed to the walls. Thus both walls can for example be made with a uniform wall thickness. However, in a further preferred embodiment the cooling device according to the present invention is characterized in that the first wall on the visible side mainly has a wall thickness thicker than a wall thickness of the second wall. The wall on the visible side of the door is after all often the most intensively influenced. Passers-by for example unexpectedly knock against it with body parts or objects such as shopping baskets and trolleys. By giving the wall on the visible side in particular

a relatively large wall thickness within the desired total thickness of the door the risk of harm to the wall such as cracks, fractures or other types of serious damage, is decreased. Furthermore, at least on the visible side the access door can be optionally provided with a scratch resistant transparent layer of coating in order to reduce scratches or other surface damage.

**[0008]** In a further preferred embodiment the cooling device according to the present invention is characterized in that at least one of both walls is made of plastic, in particular of a plastic chosen from a group of polymethylmethacrylate (PMMA), such as high impact PMMA, extruded PMMA or cast PMMA, polycarbonate (PC) and polyethylene terephthalate glycol (PETG). In addition to favourable weight savings the walls of plastic offer a further improvement by reducing condensation through good heat absorption of the material. The plastics mentioned specifically moreover have good transparent properties, so that a clear and bright view of the products offered in the cooling device is maintained.

**[0009]** A special embodiment of the cooling device according to the present invention is characterized in that both walls are made of the same plastic. This is not only beneficial in practical terms but also enables a good and reliable attachment between the walls with a suitable adhesive. Accordingly in a further preferred embodiment according to the present invention the cooling device is characterized in that the walls are attached to each other with a transparent adhesive, in particular with a transparent acrylate adhesive, provided between the edge parts. By using a transparent adhesive the access door remains at least almost fully transparent, even at the edge parts, whereas an acrylate adhesive is moreover capable of attaching the walls of acrylate so strongly that additional clamping or closing means or door frames around the circumference of the access door are unnecessary. According to the present invention the cooling device is characterized in that at least one of the walls is provided with one or more ventilation openings for ventilation between the cavity and the surrounding air, and in a particular embodiment according to the present invention is characterized in that the ventilation openings at a side of the walls facing the cavity is partly closed off with a ventilating closure member. The ventilation openings enable a ventilation of the cavity space, so that condensation on the access door is further reduced without having to comprise to much on the insulating capability of the door. In particular by using a ventilating closure device an air pressure and air temperature in the cavity space can also be adjusted at will. Condensation can be prevented particularly well when the ventilation openings are provided for in the wall at the product space side of the access door by exchanging air in the cavity with cooler drier air from the product space.

**[0010]** A further preferred embodiment of the cooling device according to the present invention is characterized in that a light source is provided for in the cavity which is capable of illuminating at least a visible side of

the access door. The light source can be used to attract the public passing by and to direct their attention more towards the products exhibited in the cooling device, while heat emitted from the light source is screened off from the product space by placing it in the cavity. Although every known type of light source can be used, the cooling device in a further preferred embodiment according to the present invention is characterized in that the light source comprises LED-lighting and in particular consists of one or more LED-strips. LED-lighting and in particular LED-strips are particularly good for placement in the cavity of the access door due to their relatively modest dimension and due to their favourable energy consumption, making a permanent connection to a power network unnecessary.

**[0011]** In a further preferred embodiment according to the present invention the cooling device is characterized in that the access door is provided with prints. This can for example be a promotional text or an image or an indication of price or other types of information. However in a particular embodiment according to the present invention the cooling device is characterized in that the prints comprise a camouflaging decorative print which is provided at least between the edge parts at a side of the first wall facing the cavity. Consequently a potentially less attractive connection between the edge parts as a result of the adhesive provided between them is removed from view, so that a view of the access door from the visible side thus remains particularly appealing regardless. Moreover the prints cannot be affected from the outside due to use on the side facing the cavity so that they remain attractive for a long period of time. When using a light source in the cavity the camouflaging decorative prints can also be used to remove the light source and fittings used from view behind the prints, so that only the light emitted from the light source remains visible.

**[0012]** In a preferred embodiment an access door of the type as used in the cooling device according to the present invention is provided with suspension means on at least two corner points of the walls. Consequently an at least almost completely prefab access door can be produced to be attached quickly and efficiently to the cooling device on-site.

**[0013]** The invention will now be explained in more detail based on an example of an embodiment and an associated drawing. The drawing shows:

- figure 1A a front view of an example of the embodiment of an access door according to the present invention;
- figure 1B a side view of the example of the embodiment of an access door according to the present invention; and
- figure 1C a detailed view of the example of the embodiment of an access door according to the present invention;

**[0014]** The figures are purely schematic and not drawn

to scale. In particular some of the parts and dimensions are represented in a more or less exaggerated matter for the sake of clarity.

**[0015]** As shown in figure 1A up to and including figure 1C an access door (1) for use in a cooling device according to the present invention comprises a completely uninterrupted first plate-shaped wall (2) of plastic at a visible side. The first wall (2) is moreover made of cast polymethylmethacrylate (cast PMMA), which is a particularly suitable plastic for use in the access door of a cooling device due to its good transparency. With its own flat edge part the first wall (2) is attached to an edge part of a plane-parallel second wall (4) which is also fully made of cast polymethylmethacrylate. The second wall (4) comprises a substantially flat central part (3) which is offset from the edge part to leave room for a cavity (5) bounded by the walls. Consequently, the second wall forms as it were a box-shaped body with a flat edge part against which the first wall is easily attachable, for example, by using an adhesive connection. In this example of an embodiment the PMMA walls are attached using a transparent acrylate adhesive so that even a connection between the walls remains at least almost transparent. As shown in figure 1A the access door comprises a gripping part (6) at the length side enabling a user to easily grasp the access door with a hand in order to adjust the access door, for example to move the door from a closed position shutting off the product space to an open position in order to take a product out of the product room. The gripping part (6) is formed by a recess in the length side of both the first as well as the second wall. The access door also comprises a corner profile (7) for a relatively simple joining of the hinge means to install the access door as a hinge door in the cooling device.

**[0016]** An attachment of the first wall (2) against a box-shaped second wall (4) results in a very stiff box-shaped construction which prevents a deformation of the access door with relatively little material. The access door is thus particularly light in weight. Moreover, the presence of a cavity space provides further improved insulation capability of the access door and reduces the appearance of condensation, undoubtedly also due to the use of plastic walls.

**[0017]** Although the invention was described in more detail solely using this one single example of an embodiment it should be clear that the invention is certainly not limited to this, but to the claims.

## Claims

1. Cooling device for keeping products chilled and displaying them, in particular food and/or beverages, comprising a product space conditioned by cooling means and bound on an entry side by an adjustable access door (1), wherein the access door comprises an at least substantially transparent multi-walled construction of an at least substantially plate-shaped

first wall (2) and an at least substantially plane-parallel second wall (4), wherein said walls each comprise an edge portion at least substantially around their periphery by which said walls are connected to each other, wherein at least one of both walls comprises a central part (3) that is offset with respect to the edge portion such that said walls mutually maintain a cavity (5) at the location of said central part (3) that is bounded by said central part (3), **characterized in that** at least one of the walls is provided with one or more ventilation openings for ventilation between said cavity (5) and surrounding air.

2. Cooling device according to claim 1, **characterized in that** said one or more ventilation openings are partly closed off with a ventilating closure member at a side of the walls facing the cavity (5).

3. Cooling device according to claim 1 or 2, **characterized in that** the first wall (2) is located at a visible side of the access door (1) and is at least almost completely flat and that the second wall (4) comprises said central part (3) which is offset from the edge part.

4. Cooling device according to claim 3, **characterized in that** the first wall (2) mainly has a wall thickness which is thicker than a wall thickness of the second wall (4).

5. Cooling device according to one or more of the preceding claims, **characterized in that** at least one of both walls is made of plastic, in particular a plastic chosen from a group of polymethylmethacrylate (PMMA), polycarbonate (PC) and polyethylene terephthalate glycol (PETG).

6. Cooling device according to claim 5, **characterized in that** both walls are made of the same plastic.

7. Cooling device according to one or more of the preceding claims, **characterized in that** the walls are attached to each other with a transparent adhesive, in particular with a transparent acrylate adhesive, provided for between the edge parts.

8. Cooling device according to one or more of the preceding claims, **characterized in that** a light source is provided for in the cavity (5) capable of illuminating at least a visible side of the access door.

9. Cooling device according to one or more of the preceding claims, **characterized in that** the light source comprises LED lighting and in particular consists of one or more LED strips.

10. Cooling device according to one or more of the preceding claims, **characterized in that** the access

door (1) is provided with prints.

11. Cooling device according to claim 10, **characterized in that** the prints comprise a camouflaging decorative print which is disposed at least between the edge parts at a side of the first wall (2) facing the cavity.
12. Cooling device according to one or more of the preceding claims, **characterized in that** the access door (1) comprises suspension means that are provided at corner points of the walls.

#### Patentansprüche

1. Kühlvorrichtung zum Kühlhalten und Ausstellen von Ware, insbesondere von Lebensmitteln und/oder Getränken, umfassend einen Warenraum, der durch Kühlmittel klimatisiert und mittels einer Zuführtür (1) an eine Zuführseite angeschlossen ist; die Zuführtür umfasst eine wenigstens im Wesentlichen transparente Mehrwandkonstruktion einer wenigstens weitgehend plattenförmigen ersten Wand (2) sowie einer wenigstens weitgehend planparallelen zweiten Wand (4); jede Wand umfasst einen Kantenbereich wenigstens im Wesentlichen um den Umfang, womit die beiden Wände aneinander angeschlossen sind; wenigstens eine der beiden Wände umfasst einen Zentralteil (3), der gegen den Kantenbereich derart versetzt ist, dass die Wände miteinander einen Zentralteil bilden, der in Bezug auf den Kantenbereich derart versetzt ist, dass die Wände am Ort des Zentralteiles (3) eine Kavität (5) miteinander bilden, die an den Zentralteil (3) angeschlossen ist, **dadurch gekennzeichnet, dass** wenigstens eine der Wände mit einer oder mehreren Belüftungsöffnungen versehen ist zum Belüften zwischen der Kavität (5) und der Umgebungsluft.
2. Kühlvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** eine oder mehrere der Belüftungsöffnungen mit einem Belüftungsverschluss an einer Seite der der Kavität (5) zugewandten Wände abgesperrt ist.
3. Kühlvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die erste Wand (2) an einer Sichtseite der Zuführtür (1) angeordnet und wenigstens annähernd vollständig eben ist, und dass die zweite Wand (4) den Zentralteil (3) umfasst, der gegen den Kantenbereich versetzt ist.
4. Kühlvorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** die erste Wand (2) eine größere Wandstärke aufweist, als die zweite Wand (4).
5. Kühlvorrichtung nach einem oder mehreren der vo-

rausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** wenigstens eine der Wände aus Kunststoff besteht, insbesondere von der Gruppe Polymethylmethacrylat (PMMA), Polycarbonat (PC) sowie Polyethylenterephthalatglycol (PETG).

6. Kühlvorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die beiden Wände aus demselben Kunststoff hergestellt sind.
7. Kühlvorrichtung nach einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Wände mit transparentem Klebstoff aneinander befestigt sind, insbesondere aus transparentem Acrylatklebstoff, zwischen den Kantenbereichen.
8. Kühlvorrichtung nach einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** eine Lichtquelle für die Kavität (5) vorgesehen ist, die wenigstens eine Sichtseite der Zuführtür beleuchtet.
9. Kühlvorrichtung nach einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Lichtquelle ein LED-Licht umfasst, insbesondere bestehend aus einem oder mehreren LED-Streifen.
10. Kühlvorrichtung nach einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Zuführtür (1) bedruckt ist.
11. Kühlvorrichtung nach Anspruch 10, **dadurch gekennzeichnet, dass** der Druck ein dekorativer Täuschungsdruck ist, angeordnet wenigstens zwischen den Kantenbereichen auf einer Seite der ersten Wand (2), der Kavität zugewandt.
12. Kühlvorrichtung nach einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Zuführtür (1) eine Aufhängevorrichtung umfasst, die an Ecken der Wände angeordnet ist.

#### Revendications

1. Dispositif de refroidissement pour garder des produits au frais et les présenter, en particulier de la nourriture et/ou des boissons, comprenant un espace pour les produits climatisé à l'aide d'un système de refroidissement et fermé sur une face d'entrée par une porte d'accès (1) ajustable, la porte d'accès étant constituée d'une construction à multiples parois au moins substantiellement transparente formée d'une première paroi (2) au moins substantiellement plane et d'une seconde paroi (4) au moins

- substantiellement plane et parallèle, lesdites parois comprenant chacune un rebord au moins sur une grande partie de leur pourtour au moyen duquel lesdites parois sont rattachées l'une à l'autre, l'une des deux parois au moins comprenant une partie centrale (3) qui est décalée par rapport au rebord de telle manière que lesdites parois renferment ensemble une cavité (5) à l'emplacement de ladite partie centrale (3) qui est fermée par ladite partie centrale (3), **caractérisé en ce que** au moins une des parois est pourvue d'une ou plusieurs ouvertures de ventilation pour assurer la ventilation entre ladite cavité (5) et l'air ambiant.
2. Dispositif de refroidissement selon la revendication 1, **caractérisé en ce que** la ou lesdites ouvertures de ventilation sont en partie fermées par un élément de fermeture avec ventilation sur un côté des parois faisant face à la cavité (5).
3. Dispositif de refroidissement selon la revendication 1 ou 2, **caractérisé en ce que** la première paroi (2) est située sur un côté visible de la porte d'accès (1) et est au moins presque complètement plate et **en ce que** la seconde paroi (4) comprend ladite partie centrale (3) qui est décalée par rapport au rebord.
4. Dispositif de refroidissement selon la revendication 3, **caractérisé en ce que** la première paroi (2) possède principalement une épaisseur supérieure à celle de la seconde paroi (4).
5. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** au moins une des deux parois est faite de plastique, en particulier un plastique choisi parmi le polyméthacrylate de méthyl (PMMA), le polycarbonate (PC) et le polyéthylène téréphtalate glycolisé (PETG).
6. Dispositif de refroidissement selon la revendication 5, **caractérisé en ce que** les deux parois sont faites du même plastique.
7. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** les parois sont rattachées l'une à l'autre au moyen d'un adhésif transparent, en particulier un adhésif acrylique transparent, placé entre les rebords.
8. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'une** source de lumière capable d'illuminer au moins un côté visible de la porte d'accès équipe la cavité (5).
9. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** la source de lumière comprend un éclairage LED et en particulier se compose d'une ou plusieurs bandes LED.
10. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** la porte d'accès (1) comporte des impressions.
11. Dispositif de refroidissement selon la revendication 10, **caractérisé en ce que** les impressions comprennent une impression décorative de camouflage qui est appliquée au moins entre les rebords sur un côté de la première paroi (2) faisant face à la cavité.
12. Dispositif de refroidissement selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** la porte d'accès (1) comprend des dispositifs de suspension qui sont placés aux angles des parois.

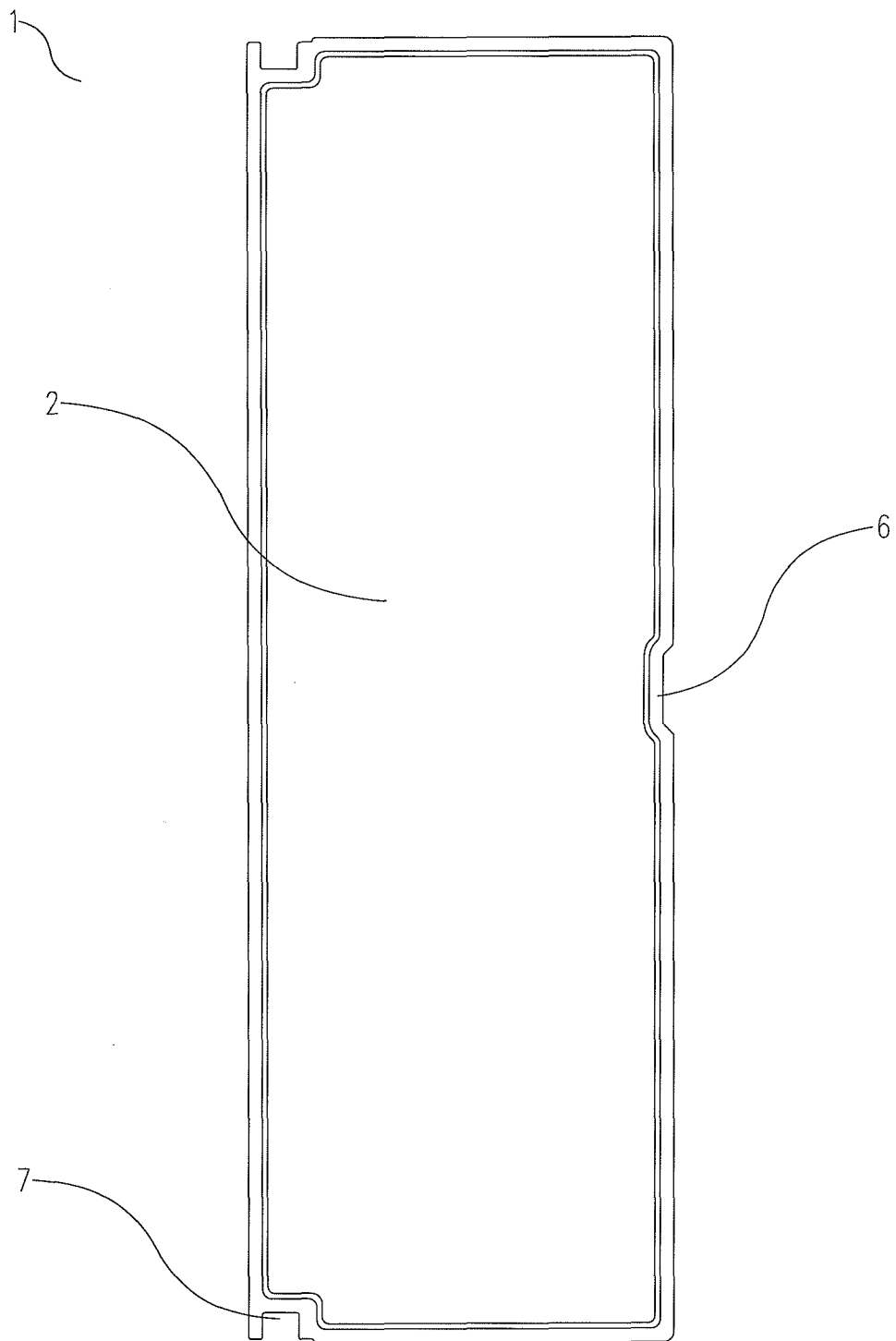
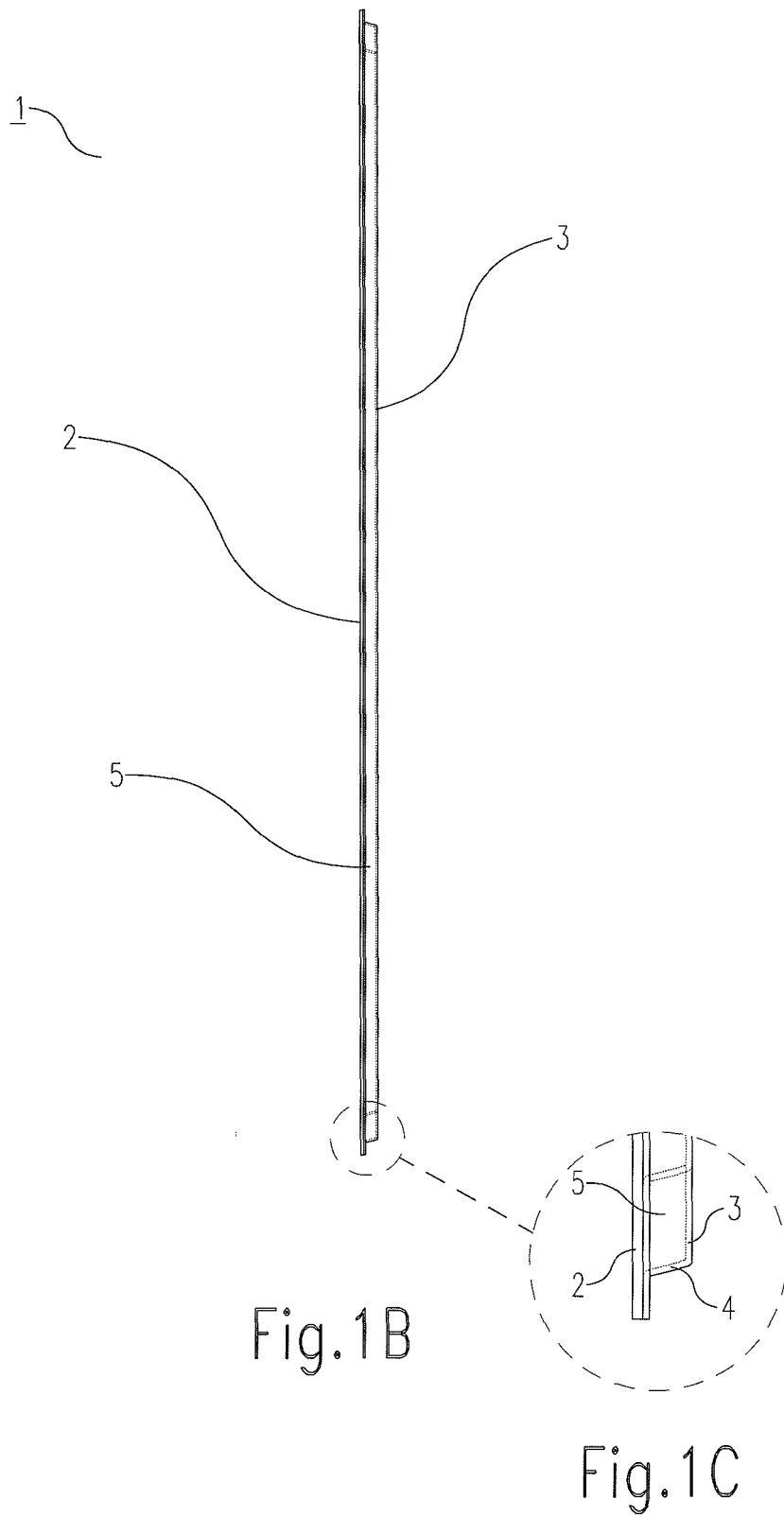


Fig.1A



**REFERENCES CITED IN THE DESCRIPTION**

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